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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,385	01/28/2004	John W. Worthington	07844-628001	4750
21876 7590 09/18/2007 FISH & RICHARDSON P.C. P.O. Box 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER ABDI, AMARA	
			ART UNIT 2624	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/767,385	Applicant(s) WORTHINGTON, JOHN W.	
	Examiner Amara Abdi	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 38 is/are allowed.
- 6) ☒ Claim(s) 1,2,9-18 and 20-37 is/are rejected.
- 7) ☒ Claim(s) 3-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :07/17/2007
08/01/2007.

DETAILED ACTION

1. Applicant's response to the last office action, filed July 17, 2007 has been entered and made of record.
2. In view of the Applicant amendments, the objection to the specification is expressly withdrawn.
3. In view of the Applicant Arguments, the objections to the claims 1,8,25, and 35 are expressly withdrawn.
4. Applicant's arguments with respect to claims 1-38 have been considered but are moot in view of the new ground(s) of rejection.

Remarks

5. Regarding claims 1,7,8,18,25,35,37, and 38, the applicant respectfully disagrees and requests the Examiner to explain why the amendments are required.

However, in response to applicant's arguments, Examiner would like to point the following precisions:

(1) Regarding claim 7, there was no objection to the claim 7 in the previous office action.

(2) Regarding claim 18, the claim 18 is depending on claim 1, and "a convolution weight", was mentioned in claim 1, line 9, therefore, "a convolution weight" of claim 18, line 7, should be changed to "**the** convolution weight";

(3) Regarding claim 37, the claim 37 depends on claim 20, and "a pixel value" was mentioned in claim 20, line 13, therefore, "a pixel value" of claim 37, line 10, should be changed to "the pixel value".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-2,12-14,18,20-21,31-33, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher (US 6,728,416) in view of Maurer (US 2005/0025378).

(1) Regarding claims 1 and 20:

Gallagher discloses a computer-implemented method and software (column 14, line 32), (the software is read as algorithm) for filtering an image including a plurality of pixels (column 3, line 42-43), the method comprising:

Receiving a forward kernel centered at a first pixel in the image (column 9, line 25-30), the forward kernel assigning forward weights to pixels in a neighborhood surrounding the first pixel (column 7, line 52-58, and column 13, line 31-32), (the selection of each weight individually is read as the determining of forward weight and backward weight),

Specifying a backward kernel centered at a second pixel within the neighborhood surrounding the first pixel (column 9, line 2-30), (the filtering in reverse direction is read as the backward kernel) based on a local attribute of the image at the second pixel (column 8, line 45-49), the backward kernel assigning backward weight to pixels in a neighborhood surrounding the second pixel (column 7, line 52-58, and column 13, line 31-32);

Gallagher does not explicitly mention the determining of a convolution weight of the second pixel based on the backward kernel and the forward kernel, and the using of the convolution weight and a pixel value of the second pixel to generate a new value of the first pixel.

Maurer, analogous environment, teaches a method for bilateral filtering of digital images, where determining the convolution weight of the second pixel based on the backward kernel and the forward kernel (paragraph [0018], line 1-7), (the bilateral filter is read as the forward and backward filters, and the determining of the bilateral convolution is read as the determining of the convolution based on backward kernel and the forward kernel) and using of the convolution weight and a pixel value of the second pixel to generate a new value of the first pixel (paragraph [0015], line 11-15).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method of Maurer, where determining the convolution weight, in the method of Gallagher in order for the digital processor to be able to implement a bilateral filter without performing any division operations (paragraph [0004], line 1-3).

(2) Regarding claims 2 and 21:

Gallagher discloses the determining of forward weight assigned to second pixel by the forward kernel (column 7, line 52-58, and column 13, line 31-32), and the determining of backward weight assigned to the first pixel by the backward kernel (column 7, line 52-58, and column 13, line 31-32), (the selection of each weight individually is read as the determining of forward weight and backward weight)

Gallagher does not explicitly mention the using of forward weight and the backward weight to determine the convolution weight of the second pixel.

Maurer, analogous environment, teaches a method for bilateral filtering of digital images, where determining the convolution weight of the second pixel using the backward kernel and the forward kernel (paragraph [0018], line 1-7), (the bilateral filter is read as the forward and backward kernel, and the determining of the bilateral convolution is read as the determining of the convolution based on backward kernel and the forward kernel).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method of Maurer, where determining the convolution weight, in the method of Gallagher in order for the digital processor to be able to implement a bilateral filter without performing any division operations (paragraph [0004], line 1-3).

(3) Regarding claims 12 and 31:

Gallagher further disclose a computer-implemented method and software (column 14, line 32), (the software is read as algorithm), where the received forward

kernel is operable to blur the image at the first pixel (column 9, line 51-62), (the blurring of the image is read as the same concept as the blurring at the first pixel).

(4) Regarding claims 13 and 32:

Gallagher further disclose a computer-implemented method and software (column 14, line 32), (the software is read as algorithm), where the specified backward kernel is operable to blur the image at the second pixel (column 9, line 51-62), (the blurring of the image is read as the same concept as the blurring at the second pixel).

(5) Regarding claims 14 and 33:

Gallagher discloses all the subject matter as described in claims 1 and 20 above.

Gallagher does not explicitly mention the method, where the received forward kernel is operable to sharpen the image at the first pixel.

Maurer, analogous environment, teaches a method for bilateral filtering of digital images, where the effect of the bilateral filter is smoothing parallel to image edges while sharpening perpendicular to the edge (paragraph [0019], line 1-3), (the sharpening perpendicular to the edge is read as the same concept as the sharpening of the first pixel by the received forward kernel).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method of Maurer, where sharpening the first pixel, in the method of Gallagher in order for the digital processor to be able to implement a bilateral filter without performing any division operations (paragraph [0004], line 1-3).

(6) Regarding claims 18 and 37:

Gallagher discloses all the subject matter as described in claims 1 and 20 above.

Gallagher does not explicitly mention the specifying of one or more further backward kernels.

Maurer, analogous environment, teaches a method for bilateral filtering of digital images, where the filtering is recursive filtering that includes four-pass recursive filtering (column 11, line 10-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method of Maurer, where specifying of one or more further backward kernels, in the system of Gallagher in order for the digital processor to be able to implement a bilateral filter without performing any division operations (paragraph [0004], line 1-3).

8. Claims 9-11 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as applied to claims 1 and 20 above, and further in view of Haumberg (US 6,791,540).

(1) Regarding claims 9 and 28:

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention that the local attribute of the image at the second pixel is a depth value corresponding to a distance of an object represented by the second pixel relative to a focal distance.

Haumberg, in analogous environment, teaches an image processing apparatus, where the depth value corresponding to a distance of an object represented by the second pixel relative to a focal distance (column 4, line 42-44), (the distance of the part of the scene represented in the pixel from the camera is read as a focal distance).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Haumberg, where the depth value corresponding to a distance of an object relative to focal distance, in the method of Gallagher in order to synthesize a new image from a desired viewpoint without relying upon a geometric model of the subject (column 1, line 6-7).

(2) Regarding claims 10 and 29:

Gallagher and Maurer disclose all the subject matter as described in claims 1,9,20 and 28 above.

Gallagher and Maurer do not explicitly mention specifying a depth map assigning a depth value to each pixel in the image.

Haumberg, in analogous environment, teaches an image processing apparatus, where specifying a depth map assigning a depth value to each pixel in the image (column 5, line 10-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Haumberg, where specifying a depth map assigning a depth value to each pixel in the image, in the method of Gallagher in order to synthesize a new image from a desired viewpoint without relying upon a geometric model of the subject (column 1, line 6-7).

(3) Regarding claims 11 and 30:

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention the method, where the local attribute of the image at the second pixel is a luminance value.

Haumberg, in analogous environment, teaches an image processing apparatus, where the local attribute of the image at the second pixel is a luminance value (column 4, line 39-41), (the intensity of the pixel is read as luminance value).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Haumberg, where local attribute of the image at the second pixel is a luminance value, in the method of Gallagher in order to synthesize a new image from a desired viewpoint without relying upon a geometric model of the subject (column 1, line 6-7).

9. Claims 15 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as applied to claims 1 and 20 above, and further in view of Szeliski et al. (US 6,215,496).

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention the receiving of an array of forward weights, each forward weight in the array being assigned to a pixel in the neighborhood surrounding the first pixel.

Szeliski et al., in analogous environment, teaches sprites with depth, where each forward weight in the array being assigned to a pixel in the neighborhood surrounding the first pixel (column 10, line 58-63).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Haumberg, where assigning forward weight to a pixel in the neighborhood surrounding the first pixel, in the method of Gallagher in order to synthesize a new image from a desired viewpoint without relying upon a geometric model of the subject (column 1, line 6-7).

10. Claims 16 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as applied to claims 1 and 20 above, and further in view of Dowski et al. (US-PGPUB 2003/0169944).

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention that the specifying of forward weight is based on a distance between the kernel location and the pixel in the neighborhood.

Dowski et al., in analogous environment, teaches an optimized image processing for wavefront coded imaging system, where the filter kernel decreasing the distance related to the values from the center (paragraph [0140], line 6-9), (the distance from the center is read as the same concept as the distance between the kernel location and the pixel in the neighborhood).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Dowski et al., where the forward weight is based on a distance between the kernel location and the pixel in the neighborhood, in the method of Gallagher in order to reduce the memory image required in hardware processing, this serves to optimize image quality with a fixed hardware processing solution (e.g. low cost solution) (paragraph [0005], line 9-13).

11. Claims 17 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher, Maurer, and Dowski et al., as applied to claims 16 and 35 above, and further in view of Lee (US-PGPUB 2003/0197877).

Gallagher, Maurer, and Dowski et al. disclose all the subject matter as described in claims 16 and 35 above.

Gallagher, Maurer, and Dowski et al. do not explicitly mention that the kernel function depends on a kernel radius.

Lee, in analogous environment, teaches a color separation method and printed product of the method, where the kernel function depends on kernel radius (paragraph [0088], line 1-3), (the blurring is read as the same concept as the kernel function).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Lee, where the kernel function depends on kernel radius, in the method of Gallagher in order to address ways for dealing with edges within a given object field by minimizing or eliminating misregistration artifacts in the printed images (paragraph [0007], line 6-9).

Allowable Subject Matter

12. The following is a statement of reasons for the indication of allowable subject matter:

Independent claims 19 and 38 are allowable over the prior art of record.

Independent claims 19 and 38 recited the limitations of: " each neighborhood pixel's convolution weight....based on a depth value assigned to the neighborhood pixel". The combination of these features as cited in the claim in combination with the other limitations of the claim, are neither disclosed nor suggested by the prior art of record.

13. Claims 3-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information:

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amara Abdi whose telephone number is (571) 270-1670. The examiner can normally be reached on Monday through Friday 7:30 Am to 5:00 PM E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wu Jingge can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amara Abdi
09/14/2007



SAMIR AHMED
PRIMARY EXAMINER